

neck black; ear-coverts pale yellow, behind which is an obscure spot of greyish white; throat and under surface pale yellowish grey striated with light brown; irides dark brown; bill black; legs and feet greenish grey. The female like the male in colour, but smaller in all her dimensions.

Total length,  $7\frac{1}{2}$  inches; bill, 1; wing,  $3\frac{3}{4}$ ; tail,  $3\frac{1}{2}$ ; tarsi, 1.

*Hab.* South and Western Australia.

*PTILOTTIS CRATITIUS.* *Ptil. vertice cinereo,—loris, strigâ superoculari, et plumis auricularibus nigris,—infrâ et ponè has, penicillo angusto, et flavo; a rictu per gulæ latera ducta appendice nudo, corneo, ad marginem inferiorem libero, et bellè e gilvo cærulescente.*

Crown of the head grey; all the upper surface olive-green; wings and tail brown, margined with greenish yellow; lores, a large space surrounding the eye and the ear-coverts black, below which is a narrow line of bright yellow; from the gape, down each side of the throat for five-eighths of an inch, a naked fleshy appendage, free at the lower end, of a beautiful lilac colour and very conspicuous in the living bird; anterior to this is a tuft of bright yellow feathers; throat and under surface olive-yellow; irides and eyelash black; bill black; feet blackish brown tinged with olive.

The female is similar to the male, but smaller.

Total length, 7 inches; bill,  $\frac{7}{8}$ ; wing,  $2\frac{1}{2}$ ; tail,  $3\frac{1}{2}$ ; tarsi,  $\frac{7}{8}$ .

*Hab.* Interior of South Australia and Kangaroo Island.

*GLYCIIPHILA ALBIFRONS.* *Glyc. facie albâ; gutture nigro, albo minutè adperso; vertice nigro, plumis albo angustè marginatis.*

Forehead, lores and a narrow ring round the eye, and a narrow line running from the angle of the lower mandible white; crown of the head black, each feather slightly margined with white; ear-coverts silvery blackish grey, behind which an irregular line of white; all the upper surface brown, irregularly margined with white, producing a mottled appearance; wings and tails brown, the primaries margined externally with yellowish green; chin and throat brownish black, the former minutely speckled with white; under surface of the wing buff; chest and abdomen white, striped with blackish brown on the flanks; irides dark brown; bill black; feet blackish brown.

The female is like the male in plumage, but smaller in size.

Total length,  $5\frac{3}{4}$  inches; bill,  $\frac{3}{4}$ ; wing,  $3\frac{1}{4}$ ; tail,  $2\frac{3}{4}$ ; tarsi,  $\frac{7}{8}$ .

*Hab.* Western Australia.

*MELIPHAGA MYSTACALIS.* *Mel. vertice et gutture nigris; strigâ superoculari angustâ, albâ; plumis auricularibus densis, albis, et penicillum posticè acutum efficientibus.*

Head, chin and throat black; over the eye a narrow line of white; ears covered by a conspicuous tuft of white feathers, which are closely set and terminate in a point towards the back; upper surface brownish black, the feathers edged with white; under surface white, with a broad stripe of black down the centre of each feather; wings and tail blackish brown, conspicuously margined with bright yellow; irides brown; bill black; feet blackish brown.

Total length,  $6\frac{1}{2}$  inches; bill, 1; wing, 3; tail,  $2\frac{3}{4}$ ; tarsi,

*Hab.* Western Australia.

Nearly allied to *Meliphaga sericea*.

PLATYCERCUS ADELAIDÆ. *Plat. vertice, pectore, abdomine medio, crissoque coccineis; lateribus viridescenti-flavis; uropygio sordidè olivaceo-flavo.*

*Fully adult male.*—Crown of the head, lores, sides of the neck, breast and all the under surface scarlet, passing into pale greenish yellow on the flanks; cheeks and wing-coverts light lazuline blue; primaries deep blue, passing into black at the extremity; back of the neck yellowish buff; back black, each feather broadly margined with greenish yellow, some of these marginations tinged with blue, others with scarlet; rump and upper tail-coverts dull greenish yellow, the latter tinged with scarlet; two centre tail-feathers greenish blue; the remainder deep blue at the base, gradually becoming lighter until almost white at the tip; irides brown; bill horn-colour; feet grayish brown.

Total length,  $13\frac{1}{2}$  inches; wing, 7; tail, 8; tarsi,  $\frac{3}{4}$ .

*Hab.* South Australia.

This species is subject to great change from youth to maturity; during the first few months it is almost wholly green, and this gradually gives place to scarlet on the head, rump, under surface and the margins of the back-feathers.

AQUILA MORPHNOÏDES. *Aq. capite cristâ suboccipitali brevi, ornato; facie nigrescente: corpore subtus rufo: plumis et pectoris et abdominis strigâ centrali nigra notatis.*

Face, crown and throat blackish brown, tinged with rufous, giving it a striated appearance, bounded in front above the nostrils with whitish; feathers at the back of the head, which are lengthened into a short occipital crest, back of the head, back, and sides of the neck, all the under surface, thighs and under tail-coverts rufous, all but the thighs and under tail-coverts with a stripe of black down the centre of each feather; back, rump and wings brown, the centre of the wing lighter; primaries brownish black, becoming darker at the tip, and barred throughout with grayish buff, which is conspicuous on the under surface, but scarcely perceptible on the upper, except at the base of the inner webs; under surface of the wing mottled with reddish brown and black; tail mottled grayish brown, crossed by seven or eight distinct bars of blackish brown, the tips being lighter; cere and bill lead-colour, passing into black at the tip; eye reddish hazel, surrounded by a narrow blackish brown eyelash; feet and toes very light lead-colour.

Total length,  $21\frac{1}{2}$  inches; bill,  $1\frac{3}{4}$ ; wing, 15; tail,  $9\frac{1}{2}$ ; tarsi,  $2\frac{3}{4}$ .

This species is very robust, and although but a small bird, is in every respect a true *Aquila*. It is nearly allied to, but much stouter than *Aquila pennata*.

*Hab.* Yarrundi on the Upper Hunter, New South Wales.

BUTEO MELANOSTERNON. *B. rostro grandi, et elongato: gula, pec-*

*tore et abdomine nigris; primariis ad basin subtus albis; cauda cinerea.*

Crown of the head, face, chin, chest and centre of the abdomen, deep black, passing into chestnut-red on the flanks, thighs and under tail-coverts; back of the head chestnut-red, becoming black in the centre of each feather; shoulders whitish buff; all the upper surface deep brownish black, margined with chestnut-red; primaries white at the base, deep black for the remainder of their length; cere and base of the bill purplish flesh-colour, passing into black at the tip; irides wood-brown; feet white tinged with lilac.

Total length, 22 inches; bill,  $2\frac{1}{2}$ ; wing,  $19\frac{1}{2}$ ; tail,  $8\frac{1}{2}$ ; tarsi,  $2\frac{5}{8}$ .

This species is nearly allied to the Red-tailed Hawk of North America, and the *Buteo Jackal* of South Africa, but from both of these it may be distinguished by the jet-black colouring and by its more lengthened bill. During flight the white at the base of the primaries is very conspicuous, and is strikingly contrasted with the black of the chest and the brown of the other part of the wings.

*Hab.* Interior of New South Wales.

FALCO HYPOLEUCOS. *Fal. corpore supernè cinereo-fusco: singulis plumis margine dilutiore cinctis: corpore subtus albo; plumis strigè fuscè apud apicem in maculam latam desinente, ornatis.*

Head and all the upper surface grayish brown, the feathers of the head having a fine stripe of black down the centre, the remainder dark brown in the centre; chin and all the under surface white, with a fine line of black down the centre, passing into a spatulate form near the tip; outer webs and tips of the primaries brownish black, the extreme ends being whitish; their inner webs whitish, crossed by numerous narrow bars, fading into a point as they approach the edge; tail gray, obscurely barred with brown, and tipped with buff.

Total length 17 inches; bill,  $1\frac{1}{4}$ ; wing,  $12\frac{1}{2}$ ; tail,  $7\frac{1}{2}$ ; tarsi,  $1\frac{3}{4}$ .

Considerably smaller, but closely allied to the Jerfalcon, *Falco Islandicus*.

*Hab.* Western Australia.

PODARGUS BRACHYPTERUS OR MACRORHYNCHUS. *Pod. rostro prægrandi (ad magnitudinem corporis ratione habitâ) et producto; colore corporis obscuro, et minutè punctulato.*

Crown of the head and all the upper surface finely freckled gray and brown, with a stripe of black down the centre of each feather, the light colour predominating on the scapularies; feathers between the eyes and the nostrils chestnut-brown, sprinkled with black and tipped with white; shoulders and lesser wing-coverts deep reddish brown; some of the feathers tipped with a white spot, freckled with red in the centre; greater coverts and secondaries mingled gray and reddish brown, the former tipped like the lesser coverts; primaries reddish brown, regularly barred with buffy-white on their outer webs, and with interrupted tawny bands on their inner webs; tail light-brown, freckled with black and gray, and crossed by numerous irregular, narrow, dark-brown bands, freckled with gray; all the under

surface grayish white, each feather crossed by numerous fine and irregular bars of tawny and with a stripe of brown down the centre, the latter colour becoming chestnut and forming a semilunar mark down each side of the neck; thighs black; irides light yellow; bill and feet brown.

Total length 15 inches; bill, 25; wing, 9; tail, 7; tarsi,  $1\frac{1}{2}$ .

In its general appearance this bird closely resembles the *Podargus humeralis*, but is even smaller in size than *P. Cuvieri*, while at the same time the bill is fully equal in size to that of the former species; it also projects much farther from the face than in any other species inhabiting Australia.

*Hab.* Swan River, Western Australia.

*MALURUS MELANOTUS.* *Mal. vertice, gula, abdomine, humeris, caudaque tectricibus lazulino-ceruleis; loris, nucha, vitæ pectorali et dorso imo nigris.*

*Male.*—Crown of the head, crescent-shaped mark on the back, upper tail-coverts, throat and under surface rich metallic lazuline blue; ear-coverts metallic verditer-blue; lores, collar round the back of the neck, line from the base of the lower mandible down the sides of the neck, band across the breast and lower part of the back jet-black; wings brown, margined with pale green; tail greenish blue, tipped with grayish white; irides, bill and feet black.

*Female.*—Lores rufous; head and all the upper surface rufous brown; all the under surface brownish white; tail bluish green, tipped with grayish white; bill rufous; irides blackish brown; feet brown.

Total length,  $4\frac{3}{4}$  inches; bill,  $\frac{1}{2}$ ; wing, 2; tail,  $2\frac{1}{2}$ ; tarsi,  $\frac{7}{8}$ .

This beautiful species may be distinguished from the *Malurus pectoralis* by its rather smaller size, and by the black band across the back.

*Hab.* Western belts of the Murray in Western Australia.

*COLLURICINCLA BRUNNEA.* *Coll. corpore supernè fusco; sic et corpore subtùs, at colore multo dilutiore; rostro nigro.*

All the upper surface pale brown; primaries and tail the same, but somewhat lighter; all the under surface brownish white, becoming almost pure white on the vent and under tail-coverts; thighs grayish brown; bill black; feet blackish brown.

Total length,  $9\frac{1}{2}$  inches; bill,  $1\frac{1}{8}$ ; wing,  $4\frac{3}{4}$ ; tail,  $4\frac{1}{4}$ ; tarsi,  $1\frac{1}{4}$ .

The sexes are alike in plumage.

This species rather exceeds in size the *Colluricincla cinerea*, Vig. and Horsf., and has a more curved, longer and stouter bill.

*Hab.* The north-west coast of Australia.

*COLLURICINCLA RUFIVENTRIS.* *Coll. corpore supernè intensè cinereo, olivaceo levitèr tincto; abdomine imo, crissoque rufis.*

Lores grayish white; crown of the head and all the upper surface deep gray, slightly tinged with olive; primaries and tail dark brown, margined with brownish gray; throat and under surface darkish gray, passing into buff on the vent and under tail-coverts; all the

feathers of the under surface have a narrow dark line down the centre; thighs gray; irides dark brown; bill black; feet dark brown.

Total length  $8\frac{1}{2}$  inches; bill, 1; wing, 5; tail,  $4\frac{1}{4}$ ; tarsi,  $1\frac{1}{4}$ .

The sexes are alike in colour.

About the size of *Colluricincla cinerea*, Vig. and Horsf., from which it may be distinguished by the uniform colouring of the back and the buffy tint of the lower part of the abdomen and under tail-coverts.

*Hab.* Swan River, Western Australia.

*PACHYCEPHALA RUFOGULARIS.* *Pach. mas*: corpore supernè fuscocentri-cinereo; gula et corpore subtùs rufis; pectore vittâ fuscocentri-cinereâ obscurè notatâ.

*Fœm. a mare differt corpore subtùs albescenti-cinereo haud rufo.*

*Male.*—Crown of the head and all the upper surface deep brownish gray; wings and tail dark brown, the feathers margined with grayish brown; lores, chin, throat, under surface of the shoulder and all the under surface reddish sandy brown, crossed on the breast by a broad irregular band of grayish brown; irides reddish brown; bill black; feet blackish brown.

*Female.*—Differs from the male in having the throat and under surface grayish white, the chest being crossed by an obscure mark of grayish brown and with a line down the centre of each feather.

Total length, 7 inches; bill,  $\frac{5}{4}$ ; wing,  $4\frac{1}{4}$ ; tail,  $3\frac{1}{2}$ ; tarsi, 1.

This species is somewhat allied to *P. pectoralis*, but may be distinguished from it by the rufous colouring of the throat, and by the band across the chest being grayish brown instead of black.

*Hab.* South Australia.

*PACHYCEPHALA INORNATA.* *Pach. olivaceo-fusca*, abdomine pallidiorè; plumis corporis inferioris strigâ fuscâ centrali levitèr notatis.

All the upper surface grayish olive; wings and tail brown, the feathers of the former broadly margined with lighter brown; all the under surface brownish gray, becoming nearly white on the vent and under tail-coverts, with a fine stripe of pale brown down each feather; irides dark brown; bill blackish brown, fleshy towards the base; feet blackish brown.

Total length, 7 inches; bill,  $\frac{5}{4}$ ; wing,  $3\frac{3}{4}$ ; tail,  $3\frac{1}{2}$ ; tarsi, 1.

This bird has somewhat the appearance of the young or female of *P. gutturalis*, but its larger size and shorter and more robust bill distinguish it from that species.

*Hab.* Belts of the Murray in South Australia.

*ZOSTEROPS CHLORONOTUS.* *Zos. dorso olivaceo-viridi; gutture et crisso virescenti-flavis.*

Lores black; crown of the head and all the upper surface olive-green; primaries and tail feathers brown, margined with olive-green; throat and under tail-coverts light greenish yellow; breast and under surface gray, tinged with brown on the abdomen and flanks; irides wood-brown; bill brown, lighter on the under mandible; legs and feet dark-gray.

Total length,  $4\frac{1}{4}$  inches; bill,  $\frac{9}{16}$ ; wing,  $2\frac{1}{8}$ ; tail,  $1\frac{3}{4}$ ; tarsi,  $\frac{5}{8}$ .

*Hab.* Western Australia.

December 8.—W. H. Lloyd, Esq., in the Chair.

A paper by G. B. Sowerby, Esq., was read, in which the author continues his descriptions of the new shells collected in the Philippine Islands by H. Cuming, Esq.

**HELIX MONTICULA.** *Hel. testâ suborbiculari, subconicâ, tenui, pallescente, lævi; spirâ brevi, subpyramidali, obtusâ; anfractibus quatuor tenerrimè (lineis incrementi) striatis, depressiusculis, ultimo magno, obtusissimè angulato, anticè depressiusculo, viridi; aperturâ subtrapeziformi, unguis posticis acutiusculis; peritremate angusto, tenuitèr reflexo, albo; columellâ albâ.*

Long. 0·9; lat. 0·9 poll.

*Hab.* supra foliis arborum apud Lallo, provinciæ Cagayan insulæ Luzon, Philippinarum.

All the varieties of this pretty species are green in front, and the apex appears to be always colourless. The following six varieties occur:—

*a.* Yellow above; circumference orange-yellow; front green. From Lallo.

*b.* Yellow above; circumference orange-yellow, with a dark brown slightly interrupted band; green in front. From St. Jaun, in the province of Cagayan.

*c.* Yellowish white above, with a narrow dull yellowish green circumferential band; green in front. From Gattarang, in the province of Cagayan.

*d.* Volutions banded in the following order: band next to the suture yellowish white; then a pale green broader band; then a yellowish white band; then a dark brown circumferential band, with jagged edges; then another yellowish white band, and then green in front. From Lallo.

*e.* Small; pale yellowish, with a light band, consisting of short dark brown lines near to the suture; a dark brown circumferential band; front dull yellowish green. From St. Jaun.

*f.* Antesutural band consisting of irregular dark brown lines arranged side by side; then a yellowish white band; then a broad, dark brown, somewhat mottled and interrupted band; then another yellowish white band, and then the green front. From Abulug, in the province of Cagayan.

**HELIX COCCOMELOS.** *Hel. testâ subglobosâ, tenuiusculâ, lævi, anfractibus quatuor rotundatis, lævigatis, striis incrementi solùm insculptis, ultimo maximo; aperturâ suborbiculari, peritremate reflexo; labio columellari albo, declivi, obtuso, depressiusculo.*

Long. 1·3; lat. 1·4 poll.

*Hab.* supra foliis arborum ad insulam Tablas dictam Philippinarum.

In general this species bears a great resemblance to a plum, for which reason I have called it *H. Cocomelos*. Several varieties may be distinguished.

*a.* Apex dark brownish red, softened off gradually to a pale yellow-green, which becomes gradually darker, until the body of the last volution is of a fine dark green: lip white.

*b.* Similar to *a*, only dark brown instead of green.

c. Of a uniform very dark chocolate-brown, except the second and third volutions, which have a rather paler central band: lip chocolate.

d. *Apex* dark chocolate-brown; upper part of the spire of a pale dull yellowish colour, becoming darker and greener toward the last volution, where the ground-colour is olive-green; an antesutural dark red-brown broad band; a circumferential band of a rather darker colour, but rather narrower, and the columellar lip surrounded by a broad dark band, which is softened off into the dark olive-green ground-colour.

e. Of an uniform pale yellow-brown, becoming very dark near the back of the lip, where it is nearly black: lip chocolate. From Calbayog, island of Samar: found on leaves of trees.

f. Similar to e, but having two narrow dark brown bands: lip nearly black behind; white in front. From Calbayog.

HELIX INTORTA. *Hel. testâ suborbiculari, subdepressâ, tenui, lævi, anfractibus*  $4\frac{1}{2}$ , *ventricosis, tenuissimè striatis, plerumque pallescente-flavidis, fasciis tribus castaneis ornatis; aperturâ sublunari, peritremate tenui, tenuiter reflexo; labio columellari rectiusculo, extûs inclinâto, obtuso.*

Long. 1; lat. 1.5 poll.

*Hab.* Supra foliis fruticum ad Loboc, insulæ Bohol, Philippinarum.

Several varieties of this beautiful species occur; most of them are marked with two brown bands, and have the circumference of the *columella* of the same colour; one is of an uniform pale brownish colour, and another is almost entirely of a very dark chocolate colour: a white line may be observed close to the suture in most of the varieties. The following are the most distinct varieties:—

a. Ground-colour pale yellowish; antesutural band very dark chestnut-brown; circumferential band of the same colour, and a broad band of the same surrounding the *columella*. From Loboc.

b. Similar to a, but considerably larger, and having a broader circumferential band. From Loboc.

c. Ground-colour of a pale brown hue; bands the same as in a.

d. Smaller than a.: ground-colour pale greenish brown; bands nearly the same, but very dark and brilliant. From Loboc.

e. Ground-colour pale yellowish brown; antesutural band softened off in front; in other respects like a.

f. Ground-colour pale yellowish; bands pale chestnut-brown. From Loboc.

g. Ground-colour pale yellow; bands increasing in width toward the back of the mouth, where they unite, and where the brown colour extends from front to back of the shell: the peritreme is entirely white, and the circumference of the *columella* also. Found on leaves of trees on the island of Siquijor.

h. Ground-colour very pale yellowish; antesutural band very narrow and indistinct; circumferential band broad, pale, and rather irregular; lip and circumference of the *columella* white. From the island of Siquijor.

i. Shell entirely of a pale lemon-yellow, except only a narrow an-

tesutural dark brown band, which becomes broader towards the lip. Found on leaves of bushes at Tanhay, in the Isle of Negros.

*k.* Ground-colour very pale yellow-brown; a brown circumferential band, which is only perceptible on the latter half of the last volution. From Loboc.

*l.* Shell of an uniform pale brownish colour. From Loboc.

*m.* *Apex* reddish-brown; upper part of the shell pale yellowish brown, increasing rapidly in intensity, so that nearly the whole of the last volution is of a dark chocolate-brown; *columella* white; lip nearly black. From Loboc.

#### MICROSCOPICAL SOCIETY.

At a meeting of the Microscopical Society held July 21st, J. S. Bowerbank, Esq., in the Chair, a paper was read from the Rev. J. B. Reade, M.A., F.R.S., on the process of charring vegetable tissue, as applied to the examination of the stomata in the epidermis of Garden Rhubarb. The author, after mentioning the great advantages derivable from charring objects for the microscope, which he first suggested, goes on to state that it is peculiarly advantageous for exhibiting delicate membranes, which cannot from their transparency be well seen by the ordinary method of viewing objects, in water between glasses. It having long been a disputed point with botanists, whether the stomata in plants were open or closed by a membrane, the author was led to examine the subject, and for this purpose took the cuticle of the common garden rhubarb, which was obtained by macerating the sheaths investing the flower-stalks for a few days in water and then charring it; from his observations he arrives at the following conclusions: That the application of the process of charring proves beyond a doubt, that the stomata in this tissue of the rhubarb are distinct openings into the hollow chambers of the parenchyma of the leaf; that the perforation is the rule and not the exception in the structure; and that the exception, where it exists, *i. e.* where the stomata are closed, proves the existence of the overlying membrane discovered and described by Dr. Brown. Some discussion then followed, in which Messrs. Gray, Lindley, and Quekett took a part.

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#### MISCELLANEOUS.

*Analogies of European and Indian Geology.*—“Notwithstanding the difficulty of establishing the identity in remote quarters of the world, of rocks so vaguely characterized as the saliferous marls, yet when we have coal-measures affording a certain fixed point, or landmark to guide us, we cannot be very far out in fixing upon the green marls, or often friable sandstone, which extend along the lower ridges of many parts of the great Himalayan chain, immediately adjoining the plains of Hindostan, as the Indian equivalent of the beds in question. Along the southern side of Assam we have the same rocks as well as brine-springs, and an earthy limestone, probably



equivalent to the English *lias*. On the face of the Cherra mountain the green marl rests unconformably on old red sandstone (or that on which the coal formation rests), and gives support to the deposits of sand in which the marine remains are contained. It is here by no means destitute of fossils as in other localities; on the contrary, we found in it six species of univalve shells, a small species of *Echinus* and a large spined *Cidaris*. In a note which we made on the characters of a fragment of rock brought away from a submerged reef near Arracan, by the hull of a ship which struck upon it, we pointed out the resemblance between its appearance and that of the green conglomerates in question\*.

“A description of the salt formations at the head of the Indus, and their relative position to the coal-measures recently found there by Mr. Jameson, will be the means of casting much important light on this subject in regard to India, and we have fortunately in the gentleman alluded to a geologist near the spot, fully alive to the importance of this and other questions of a similar nature. Another equally important question is the situation of the great repositories of salt in the vicinity of Ajmeer and other situations in Central India, where salt lakes abound. Lieut. Fraser, of the Engineers, we recollect, sent us a fragment of rock-salt, which was found imbedded in a basaltic rock when sinking a well at Mhow, about three feet from the surface. We have not heard that this curious fact has led to any further discovery or research in the neighbourhood alluded to.

“It would be extremely important if we could establish good distinguishing characters between the limestone of the coal-measures and that of the more ancient formations, but this, if a matter of difficulty in England, is at least an equally difficult thing in India. It is true, the subject has here been as yet little investigated, but we cannot place the least confidence in those practical men who employ names without thinking of their meaning, and speak confidently of *lias*, and carboniferous limestone, primitive limestone, &c., according as they happen to suppose any particular specimen they meet with in India to be one or other. The limestone so abundant in Kemaon, as to form the greater portion of that mountainous district, is so much like the limestone of the coal-measures at Cherra Ponji, that no one unacquainted with the peculiar relations of the two rocks would suppose them to be at all different. The geologist, however, perceives the vast difference between them at once: the one reposes on clay-slate, the other on sandstone; the one occurs in thick continuous beds, the other alternates with shale; the one abounds in fossils, which scientific men alone would think of looking for, and in the other the geologist alone would know that he might look for fossils in vain. Speaking of the difference between the limestone of the Silurian system and that of Coalbrook dale, Mr. Murchison says, that the organic remains, which are in great profusion in the latter, consist of shells and corals which are characteristic of the carboniferous limestone in many other parts of Great Britain, and *never* occur in

\* Journ. Beng. As. Soc. 1838, p. 936.

the inferior limestones of the Silurian system. Among these the most prominent are the large *Productus hemisphericus*, and many corals, including *Lithodendron sexdecimale* (*Clodocora* of Ehrenberg), which is so abundant that it constitutes the greater part of the layers of black calcareous shale which divide the beds of limestone. The black limestone in which these remains are found is overlaid by a sandstone which separates it from the productive coal-beds, and is underlaid by strata belonging to the lower limestone.

“Mr. Murchison particularly alludes to a specimen of *Lithosortion floriforme*, a species of coral two feet five inches broad by one and a half high, which appeared in a quarry to retain the original position in which it grew, and conveyed the impression that it had remained undisturbed beneath the sea, while fine red sand at one time, and mud at another, were deposited around it.

“These corals are also found in the limestone of the Cherra Ponji coal-measures; and in a large heap of limestone collected by Mr. Inglis of Chattaek, for the purpose of burning for lime, I found the first fossil I had observed in a similar rock in India, thus indicating the presence of a coal district. The object of the journey would not, however, admit of my visiting the quarry, but there can be no question that the rock alluded to is connected with the numerous indications of coal formations that have been found in that vicinity. One other corresponding character may be mentioned between the Cherra Ponji coal-beds and those of Coalbrook dale, namely, that the coal-measures do not graduate downwards into the older rocks. The limestone of Cherra, which alternates with beds of sandstone and shale, seems to rest immediately on the old red sandstone, as in the Coalbrook dale beds. Mr. Murchison observes, that the carboniferous limestone has not in Coalbrook dale any regular downward passage into the old red sandstone, as in other districts; on the contrary, the old red terminates at the southern end of the tract, and has never been found beneath the coal-measures. On the north bank of the Severn the underlying stratified rocks throughout the productive coal-field consists of various members of the Silurian system.

“Mr. Murchison concludes his observations on this coal-field by a notice of the faults and dislocations occasioned by trap rocks. The district affords proofs of having been raised up from beneath the surrounding new red sandstone in separate wedge-shaped tracts, the most remarkable dislocation being that which bounds the coal-field to the east. The coal-measures along this line are not less than 1000 feet thick, and as some of the lower seams of coal are thrown up to the level of the overlying strata of new red sandstone, the upcast is thus shown to have exceeded 1000 feet, though to what further extent has not yet been ascertained. It will be recollected that we formerly explained the elevated position of the Cherra coal-measures in precisely the same way that Mr. Prestwich and Mr. Murchison now account for the great upcast of the Coalbrook dale field\*, the only difference in the two cases being, that in India the

\* See Report of a Committee for investigating the Coal and Mineral Resources of India. Calcutta, 1838, p. 24.

dislocation is not confined to the coal-measures, but extends to the old red sandstone, the whole series of which, with the coal-measures reposing on them, having been at Cherra Ponji thrown 3000 feet above those which have been recently found by Major Lister and others at the bottom of the same mountains. It is of much importance to draw comparisons between geological phenomena of this nature in remote parts of the earth, as tending not only to put our theories to the test, but also to correct and give confidence to our views, which, however complicated they may appear when derived from a narrow field of observation, become gradually simplified and important in proportion as our data become general."—*M'Clelland's Calcutta Journal of Natural History.*

*Suggestions for Experiments on the Conservation of Vegetative Powers in Seeds, circulated by a Committee of the British Association.*—These experiments are intended to determine the following questions:—

1. What is the longest period during which the seeds of any plant under any circumstances can retain their vegetative powers?
2. What is the extent of this period in each of the natural orders, genera and species of plants? and how far is it a *distinctive* character of such groups?
3. How far is the extent of this period dependent on the apparent characters of the seed; such as size, hardness of covering, hardness of internal substance, oiliness, mucilage, &c.?
4. What are the circumstances of situation, temperature, dryness, seclusion from the atmosphere, &c. most favourable to the preservation of seeds?

To answer these questions satisfactorily will require the accumulation of a large mass of facts; and although there are many difficulties in the way of such an investigation, and many years may elapse before it can be brought to maturity, yet it is desirable that the British Association should commence the collection of materials for the purpose. It is proposed then to invite botanists and others to undertake the following series of experiments, and to communicate the results to the British Association.

These experiments are either Retrospective or Prospective.

#### A. RETROSPECTIVE EXPERIMENTS.

1. By collecting samples of ancient soils from situations where vegetation cannot now take place, and by exposing these soils to air, light, warmth, and moisture, to ascertain whether any, and if any, what, species of plants spontaneously vegetate in them.

N.B.—Care must of course be taken that no seeds obtain admittance into these soils from external sources,—such as the air or water introduced to promote vegetation.

These ancient soils are either *natural* or *artificial* deposits.

The *natural* deposits belong either to *past* geological periods or to the *recent* period.

a. The deposits of past periods are either secondary or tertiary.

N.B.—There seems every reason to believe that the age even of the latest of these deposits is far beyond the maximum

period through which vegetative powers can be preserved; yet as many accounts are recorded of seeds vegetating spontaneously in such soils, it would be well to set these statements at rest by actual experiment.

In such experiments, state the formation, and describe the geological phenomena of the locality, together with the depth from the present surface at which the soil was obtained.

*b.* Natural deposits of the recent period may be classed as follows:—

Alluvions of rivers.

Tidal warp land.

Shell marl.

Peat.

Surface-soil buried by landslips.

Ditto ditto by volcanic eruptions.

In these cases, state the nature of the soil, the depth from the surface, &c.; and especially endeavour to obtain an approximate date to each specimen of soil, by comparing its depth from the surface with the present rate of deposition, or by consulting historical records. It would be well to submit to experiment a series of samples of soil taken from successive depths at the same locality.

*c.* Artificial deposits are as follows:—

Ancient tumuli.

Ancient encampments.

The soil beneath the foundation of buildings.

The soil with which graves, wells, mines, or other excavations have been filled up.

Ridges of arable land, &c.

In these cases, state, as before, the depth from the surface, and ascertain from historical sources the approximate age of the deposit.

2. By trying experiments on actual seeds which exist in artificial repositories. These are,—

Seeds in old herbaria and botanical museums.

Seeds obtained from mummies, funereal urns, at Pompeii, Herculaneum, &c.

Dated samples of old seeds from nurserymen and seedsmen.

In these cases, state the circumstances in which the seeds have been preserved, and their date as nearly as it can be ascertained.

#### B. PROSPECTIVE EXPERIMENTS.

In this department of the inquiry, it is proposed to form deposits of various kinds of seeds under different conditions, and to place a portion of them at successive periods under circumstances calculated to excite the process of vegetation. In the case of certain species or families of plants, it would perhaps require many centuries to determine the limit of their vegetative powers, yet it is probable that a very few years would suffice to fix the maximum duration of the greater number, and that many interesting results might thus be obtained even by the present generation of botanists. It is proposed then to form a collection of the seeds of a great variety of plants, (including, wherever it is possible, at least one species of every genus,) and to pack them up (carefully labelled)

either alone, or mixed with various materials, as sand, sawdust, melted wax or tallow, clay, garden mould, &c. in various vessels, as glass bottles, porous earthen jars, wooden boxes, metal cases, &c., placed in various situations, as under-ground, in cellars, dry apartments, &c. At certain intervals increasing in extent,—say at first every two years, then every five, every ten, and, at the lapse of a century, every twenty years, a small number (say twenty) of each kind of seed, from each combination of circumstances, to be taken out and sown in an appropriate soil and temperature, and an exact register kept of the number of seeds which vegetate compared with those which fail.

Should it appear desirable for this project to be carried out by the British Association, they might most effectually accomplish it by committing a collection of seeds, formed on the above plan, to some qualified person, whose duty it should be, in consideration of a small annual stipend, to take charge of them, and at stated periods to select portions for experiment, keeping an accurate register of the results.

In this manner it is believed, that in regard to the large majority of plants, the limit of their vegetative durability would be determined in a very few years, and that a large mass of vulgar errors on this subject, which now pass current for facts, would be cancelled and exploded.

N.B.—The most effectual way of exciting vegetation in seeds of great antiquity, is to sow them in a hot-bed, under glass, and in a light soil moderately watered.

METEOROLOGICAL OBSERVATIONS FOR JULY 1841.

*Chiswick.*—July 1. Overcast. 2. Hazy: overcast and fine: slight rain. 3. Hazy and mild: very fine. 4, 5. Very fine. 6. Rain: fine. 7. Fine: rain. 8. Fine: clear. 9. Very fine. 10. Fine: rain. 11. Overcast. 12. Cloudy and mild. 13. Cloudy. 14. Showery. 15. Heavy thunder-showers: constant heavy rain. 16. Cloudy. 17, 18. Fine. 19. Very fine. 20. Heavy rain. 21. Overcast: rain. 22. Cloudy. 23. Cloudy and fine. 24, 25. Cloudy. 26, 27. Light haze: fine. 28. Cloudy. 29. Cold and dry: cloudy: slight rain. 30. Fine but cool. 31. Rain: cloudy.—The quantity of rain which fell on the 15th was unusually great, amounting to nearly an inch and a half in the course of the twenty-four hours.

*Boston.*—July 1. Rain. 2. Cloudy. 3. Fine. 4. Cloudy: rain P.M. 5. Cloudy. 6. Rain and stormy: rain early A.M.: rain P.M. 7. Cloudy: rain P.M. 8. Fine. 9. Cloudy: rain P.M. 10. Fine: rain early A.M. 11. Cloudy. 12. Fine: rain P.M. 13. Cloudy: rain P.M. 14. Fine. 15, 16. Fine: rain P.M. 17. Fine. 18. Cloudy: rain P.M. 19. Fine: rain P.M. 20. Rain: rainy day. 21. Cloudy: rain P.M. 22. Cloudy: rain P.M., with thunder and lightning. 23. Cloudy: rain P.M. 24—28. Cloudy. 29. Cloudy and stormy: rain A.M. and P.M. 30. Fine. 31. Cloudy: thunder and lightning P.M.

*Applegarth Manse, Dumfries-shire.*—July 1. Fine: one shower. 2. Fine and fair, but cloudy. 3. Sunshine and rain. 4. Slight showers. 5. Rain all day. 6. Fair and fine. 7. Cloudy A.M.: fine P.M. 8. Fine: one shower. 9. The same. 10. Wet afternoon. 11. Slight showers. 12. Slight showers, but heavier. 13. Heavy showers: thunder. 14. Incessant showers. 15. Heavy rain till noon. 16. Fair and fine. 17. Fair but threatening. 18. Fair and warm: thunder. 19. Fine with a few drops. 20, 21. Rain P.M. 22. Slight showers. 23. Cloudy but fair. 24. Fine all day. 25. Remarkably fine. 26. Showers. 27. Showers P.M. 28. One slight shower. 29. Fair throughout. 30. Fair but threatening. 31. Fair with a few drops.